monkeys should lack poliocidal properties even when the serum of the same animal can be shown to possess inactivating power, as was true in these experiments. This fact is in marked contrast to the distribution of immune bodies in some other infections of the central nervous system, such as neuro-syphilis, involvement of the brain and cord, whether latent or manifest, giving rise with great regularity to the appearance of the Wassermann reagin in the blood as well as in the cerebrospinal fluid. The reasons for this discrepancy seem to be worthy of further investigation.

8167 C

Effect of Adrenalectomy on Poliocidal Property of Serum of Normal Cebus and Convalescent Rhesus Monkeys.*

CLAUS W. JUNGEBLUT AND M. MAXIM STEINBACH.

From the Department of Bacteriology, College of Physicians and Surgeons, Columbia University.

In preliminary experiments it was reported that the natural poliocidal property of the serum of one Nicaraguan Cebus monkey was lost after subjecting the animal to bilateral adrenalectomy.[1] It was also demonstrated that this property could be restored by the addition of a small amount of cortical hormone, but not of adrenaline, to the deficient serum. In order to lend significance to this isolated observation it became necessary to repeat these experiments on a larger scale. Furthermore, it seemed of interest to extend the scope of this work to an investigation of the effect of adrenalectomy on the virucidal property of the serum of rhesus monkeys which had recovered from a paralyzing attack of poliomyelitis.

In conducting these experiments it was soon discovered that there exists a fundamental difference between black-faced Cebus monkeys from South America and white-faced Cebus monkeys from Central America with respect to the presence of natural poliocidal substances in their serum. Thus, in keeping with previous experience,[2] the normal serum of 3 Nicaraguan Cebus monkeys produced either complete or partial neutralization of poliomyelitis virus *in vitro*, 2

* Under a grant from the Rockefeller Foundation.

1 Jungeblut, C. W., *J. Bact.*, 1934, **27**, 81.

2 Jungeblut, C. W., and Engle, E. T., PROC. SOC. EXP. BIOL. AND MED., 1932, **29**, 879.

monkeys receiving the serum-virus mixtures intracerebrally remaining entirely free from symptoms, while the 3rd animal developed partial paralysis on the 17th day. On the other hand, the normal serum of 3 Brazilian Cebus monkeys gave no evidence whatsoever of being capable of inactivating the virus *in vitro*. Three control monkeys receiving the same amount of virus, *i. e.*, 0.2 cc. 10% virus suspension, mixed with 0.8 cc. saline accompanied these tests. All developed complete paralysis within from 7-9 days.

After having demonstrated the presence of natural poliocidal substances in the serum of 3 Nicaraguan Cebus monkeys, these animals were subjected to bilateral adrenalectomy. The adrenals were exposed by a paravertebral incision, with the last rib as the upper landmark, the vessels were ligated, and both glands removed *in toto* in one stage. The immediate effects of the operation were well tolerated by all 3 animals. Symptoms of adrenal cortical deficiency set in between the sixth and ninth day, leading to death within a few hours. Three to 5 days following removal of the adrenals the animals were bled again and their serums tested for virucidal property. None of the serums obtained from the adrenalectomized animals showed any evidence of neutralizing capacity, the monkeys receiving the serum-virus mixtures developing complete paralysis, like 2 control monkeys, within from 6-9 days.

Bilateral adrenalectomies were then carried out on 3 rhesus monkeys which had retained considerable residual paralysis following a previous attack of experimental poliomyelitis. In addition, one rhesus monkey which had been actively immunized by a series of subcutaneous injections of live virus over a period of 3 weeks was subjected to the same operation. These animals were selected from a larger group of similar animals because their serums when tested before the operation possessed definite virucidal property. The 4 animals referred to above, even though the adrenals in 2 of them had been removed in 2 stages, tolerated the operation not nearly as well as the Cebus monkeys. Symptoms of cortical deficiency set in between 24 and 48 hours and caused death shortly thereafter.† Neutralization tests carried out with the serums taken after adrenalectomy indicated that in 3 out of 4 cases the serum had not lost its neutralizing capacity as the result of the adrenalectomy. The experiments described in this paragraph were ade-

† We have satisfied ourselves that the short survival time was not altogether due to the particular condition of the animals since 3 normal rhesus monkeys subjected to bilateral adrenalectomy died within from 24 hours to 5 days after the operation.

quately controlled by the inclusion of 5 control monkeys, all of which developed complete paralysis within from 6-10 days.

Although the number of experimental animals in the several categories is small—due to technical difficulties peculiar to this type of work—the results are nevertheless so consistent that it seems safe to draw certain conclusions. While bilateral adrenalectomy is regularly followed by a disappearance from the serum of the natural poliocidal substance, it would appear that the same operation does not ordinarily change this property of the serum in animals which have acquired it as the result of convalescence from the disease or by active immunization. It is impossible to say, however, whether this difference indicates a qualitative dissimilarity in the nature of the 2 virucidal principles involved or is caused by variations in the quantities present. At any rate, our results agree well with similar observations of Marmorston-Gottesman and Perla[3] on the effect of suprarenalecomy on the natural and acquired resistance of rats to typhoid vaccine.

8168 C

A Value for the Tension at the Surface of a Myxomycete.

DARWIN VEXLER. (Introduced by E. Newton Harvey.)

From the Laboratory of Physiology, Princeton University.

It has appeared of interest to obtain a value for the tension at the surface of a myxomycete* in view of the fact that these organisms exhibit relatively rapid protoplasmic streaming. The method used was the oil drop one of Harvey and Marsland.[1] An oil droplet is injected into the organism and is then pulled out by centrifugal force while under observation in the microscope-centrifuge. The buoyant force of the oil is equated to the tension around the circumference of a neck of protoplasm of the same diameter as the oil drop.

$$\pi DT = V_0(\Delta\rho)CG$$

[3] Marmorston-Gottesman, J., and Perla, D., PROC. SOC. EXP. BIOL. AND MED., 1931, **28**, 648.

* The myxomycete used (Physarum polycephalum) was obtained from the University of Pennsylvania through the courtesy of Dr. W. Seifriz.

[1] Harvey, E. N., and Marsland, D. A., *J. Cell. and Comp. Physiol.*, 1932, **2**, 75.